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THE COMBINED ARM BATTALION AND AIRLAND BATTLE (U) ARMY  
COMMAND AND GENERAL STAFF COLLEGE LEAVENWORTH KS  
SCHOOL OF ADVANCED MILITARY STUDIES W L CLARK

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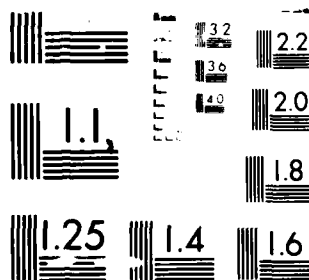
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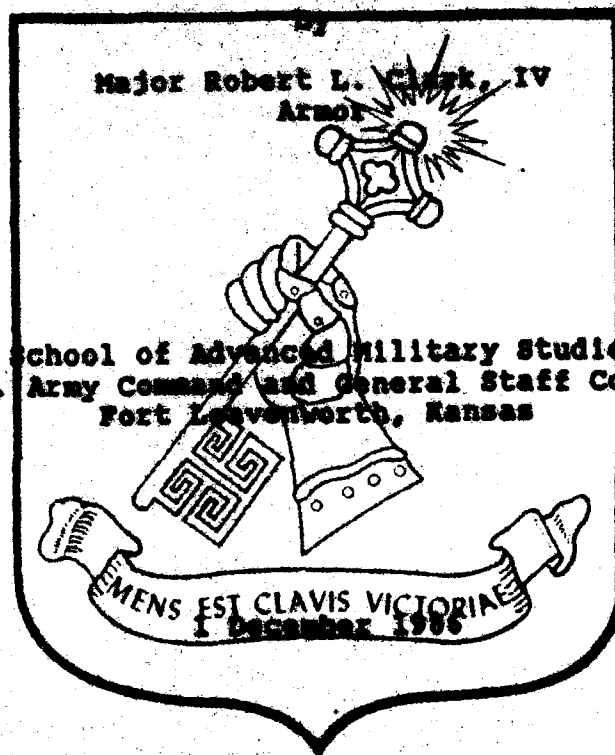
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The Combined Arms Battalion and Airland Battle



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School of Advanced Military Studies  
U. S. Army Command and General Staff College  
Fort Leavenworth, Kansas

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This monograph concludes that infantry and armor are the only two arms that should be combined organically at battalion level. By combining these two arms permanently, it is almost certain that the combat potential of the organizations will increase.

The Combined Arms Battalion and Airland Battle

by

Major Robert L. Clark, IV  
Armor

School of Advanced Military Studies  
U. S. Army Command and General Staff College  
Fort Leavenworth, Kansas

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Monograph Approval

Name of Student: Major Robert L. Clark, IV  
Title of Monograph: The Combined Arms Battalion and Airland Battle

Approved by:

Charles C Cannon  
Lieutenant Colonel Charles C. Cannon, Jr., M.S.

Monograph Director

Richard Hart Sinnreich  
Colonel Richard Hart Sinnreich, M.A.

Director, School  
of Advanced  
Military Studies

Phillip J. Brookes  
Phillip J. Brookes, Ph.D.

Director,  
Graduate Degree  
Programs

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### ABSTRACT

THE COMBINED ARMS BATTALION AND AIRLAND BATTLE, by MAJ Robert L. Clark IV, USA, 43 pages.

This monograph addresses how combined arms organizations should be formed in our Army today. Specifically, it focuses on the question, "what arms, if any, should be combined organically at battalion level?" This issue is important because our AirLand Battle doctrine considers combined arms to be essential to winning on the modern battlefield. Therefore, we should investigate the best means by which to maximize the potential of the organizations.

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## THE COMBINED ARMS BATTALION AND AIRLAND BATTLE

All great military leaders have understood the value of combined arms and have attempted to gain the greatest possible effects from the existing weapons and arms. Throughout history, those most successful in combining arms have normally also been the most successful on the battlefield. In the mid 18th century, Frederick the Great, King of Prussia, combined the use of cavalry<sup>1</sup> and artillery as supporting arms for the infantry. Napoleon used his elite infantry to advance towards the enemy while the artillery reserves fired canister and the cavalry completed the destruction.<sup>2</sup> This combining of arms has continued with military leaders seeking to gain a synergistic effect from the integration of all the individual arms to achieve decisive results. In fact, Airland Battle, the United States Army's basic fighting doctrine, considers combined arms to be essential to winning on the modern battlefield and includes as one of its imperatives, "combine arms<sup>3</sup> and sister services to complement and reinforce." It has been said that mechanized warfare has developed to the point where<sup>4</sup> combined arms is essential for survival, let alone victory.

While there is agreement concerning the need for combined arms, there has been much controversy over the best organizational method to achieve the actual combination. Traditionally, the U. S. Army has achieved combined arms through task organizing or creation of ad hoc temporary organizations.

However, recently this method has been challenged. Numerous articles have appeared in professional magazines suggesting the creation of permanently structured combined arms organizations and actual combined arms organizations have been formed. The 1st Cavalry Division has recently requested and received permission<sup>5</sup> from FORSCOM to organize and test combined arms battalions. Combined arms battalions have already undergone field evaluations within the 9th Infantry Division. The 1st brigade of the 4th Infantry Division at Ft. Carson took the initiative to combine armor and infantry arms into permanent battalion task forces in 1982 in preparation for training at the National Training Center.<sup>6</sup>

These attempts to place various arms together into a permanent organization are contrasted with the routine task organizing methods that have occurred since World War II. General McNair's concept of the triangular division included "pooled" units that were attached to a division for a specific mission, creating a task organized or ad hoc combined arms organization. The attached units would be returned to corps or Army control upon mission completion.<sup>7</sup> This practice of creating temporary combined arms organizations continued even though later experience demonstrated the need for routine combination of various arms. After the Korean War, the strategic considerations caused by the development of nuclear weapons resulted in an organization called the Pentomic Division. Designed to be sufficiently balanced between the arms and logistically self-supporting, this structure allowed the attachment of one tank

company, one engineer company, and one 105 mm howitzer battery to each battle group.<sup>8</sup> Methods of combining arms did not change with the Reorganization Objectives Army Division (ROAD); it permitted the division, brigade, and battalion commanders to task organize their units to achieve integration of arms as the mission required. The Heavy Division 86 organization continued this concept of task organizing and tailoring. Finally, the Army of Excellence retains the same practice today. Thus, the practice of creating combined arms organizations on an ad hoc basis has not been seriously challenged in any force design since 1942. It is time to consider seriously the idea of combined arms organizations and how best to form them.

This issue of how combined arms organizations should be formed in our Army today is relevant for numerous reasons. The most obvious reason has already been stated, that is, we intend to fight using combined arms. Therefore, we should investigate the best means by which to maximize the potential of the organizations. The Army's modernization program provides an excellent opportunity to adopt permanent combined arms organizations. In the past, primary weapon systems did not always complement each other to the degree they do today. The M1 Abrams Tank, the M2 Bradley Fighting Vehicle, and the M9 Armored Combat Earthmover are fully capable of supporting each other on the battlefield. Finally, our AirLand Battle doctrine demands rapid concentration of combat power. The present concept of task organizing to achieve combined arms is time consuming and often

must occur during conditions when time is a limited resource.

This monograph will address this issue by answering the question, "what arms, if any, should be combined organically at battalion level?" To limit the scope, I will restrict my examination to the arms of infantry, armor, artillery, and engineer. First, the theoretical foundation for combined arms will be established. Then, I will examine both historical and contemporary evidence to derive a set of criteria that can be used to analyze the four selected arms in terms of the anticipated AirLand battlefield environment. Finally, conclusions concerning the structure of a combined arms battalion will be drawn from the analysis.

Before discussing the theoretical foundation, it is important that a common definition of combined arms be established. The 1949 Field Service Regulations describes combined arms as the "combined coordinated action or teamwork of all arms and services that is essential for success."<sup>9</sup> William S. Lind, a leading military reformist, states that "combined arms is hitting the enemy with two or more arms simultaneously in such a manner that the actions he must take to defend himself from one<sup>10</sup> make him more vulnerable to another."

Captain House, in his research survey, states the "combined arms concept is the basic idea that different arms and weapon systems must be used in concert to maximize the survival and combat effectiveness of each other."<sup>11</sup> Simply put, each arm or weapon system has its own strengths and weaknesses. The combined arms concept permits the strengths of one system to offset the

weaknesses of another system and vice versa.

While these definitions describe various aspects of combining arms, none fully describes the positive synergistic effect (a sum greater than the individual parts) attained by the integration of arms that results in the reinforcement of strengths and the partial negation of inherent weaknesses. It is this aspect that I consider essential; therefore, for the purpose of this monograph, combined arms is defined as the synergistic effect created by the integration of different arms and weapons systems in order to maximize the survival and combat effectiveness of each other.

Having established a working definition, we now need to discuss the theoretical foundation for combined arms forces. The thoughts of three theorists are relevant: Carl Von Clausewitz, Baron De Jomini, and Colonel G. F. R. Henderson. Clausewitz discussed the importance of combined arms and the relationship between infantry, artillery, and cavalry in terms of three factors: the destructive power of firearms, the ability to hold<sup>12</sup> terrain, and mobility. Although each arm was characterized by one of these factors, Clausewitz believed only the infantry combined all three qualities. The other two arms were deficient to some extent. For example, the artillery's effectiveness came from its destructive fire power while it lacked the ability to hold terrain. Cavalry was superior in mobility but lacked destructive firepower.

Because of their individual strengths and weaknesses, it is

clear that a combination of infantry, cavalry, and artillery<sup>13</sup> would result in better use of all of them. Having all three arms available, any one of the functions represented by the specific arm could be increased based on need. Clausewitz also believed that a combination of all three arms resulted in the greatest strength but the optimum proportion of arms was almost impossible to determine. He concluded that infantry was the main branch of the service while cavalry and artillery were<sup>14</sup> supplementary. Also, in general terms, artillery was more valuable in support of the infantry than the cavalry.

While Baron De Jomini did not discuss the concept of combined arms at any great length in his work, The Art of War, he did state that a commander having a combat force of various arms should employ them in such a way that they can provide mutual<sup>15</sup> support and assistance to each other. The arms should be used simultaneously in a manner that provides mutual support,<sup>16</sup> enhancing the strengths of individual systems. Jomini further illustrated the importance of combined arms when he stated their<sup>17</sup> use should receive the whole attention of the general.

Colonel G. F. R. Henderson states,

Each of these (arms) possesses a power peculiar to itself, yet is dependent, for the full development of its power, to a greater or lesser degree upon the aid and cooperation of the rest.<sup>18</sup>

Henderson spoke about the infantry and the artillery being vulnerable if without cavalry. The cavalry was needed to act as the eyes and ears of the force. He said that any force that takes the field must be composed of all three arms in order to be

successful.

More recent military thinkers and practitioners such as Fuller, Rommel, and Guderian share this thought. Although Fuller spoke about combining the tactical functions (protection, offensive action, and movement) rather than arms, he realized the importance of combining them to gain maximum effects.<sup>19</sup> Rommel<sup>20</sup> described combination of arms as cooperation between arms. Finally, Guderian wrote about the effectiveness of arms by discussing the importance of "all arms"<sup>21</sup>. Thus, the common thread that links these early theorists and more recent practitioners is their common belief that arms should be used in combination to gain the greatest results.

A generalization that can be made from this discussion is that, for many years, the whole idea of combining arms has been widely accepted as a means to increase the combat power of a force. As such, the question is not whether the concept of combining arms is a valid one, but how best to accomplish the combining of those arms.

Having discussed the theoretical importance of combined arms, it is necessary now to discuss the criteria derived from historical and contemporary evidence. The criteria will be used to determine how a unit should be organically structured.

#### Discussion of Derived Criteria from Historical and Contemporary Evidence

The following criteria identified during the analysis process are key factors for consideration when determining what



arms should be organically combined at battalion level. The impact of each criterion is significant in the battles or contemporary examples and thus, worthy of application in answering the basic question posed in this monograph. The five criteria that became readily apparent during the examination of the different examples are: frequency of interaction, competence of commander to synchronize the effects of weapon systems, scarcity of resources, scope of tactical mission, and similarity in range and mobility. Each criterion is discussed below.

#### Frequency of Interaction

Frequency of interaction is the degree to which different arms routinely reinforce or supplement each other on the battlefield. Its selection as a criterion is based on the need to evaluate which of the four arms habitually operate together. It may be desirable to combine organically those that are habitually associated.

Frequency of interaction is derived from a review of historical evidence regarding the formation and the maturing of General McNair's reorganization ideas before World War II. General McNair conceived of the triangular division based on his observation of the field exercises of 1937, 1939, and other experiences. General McNair believed the standard triangular infantry division base should have only those minimum essential forces needed to fight an offensive-oriented battle. Thus, the base contained three infantry regiments, four artillery battalions, a reconnaissance troop, and an engineer battalion.

Any combining of additional arms would occur on an "as required" basis. The objective of General McNair's design for tactical organization was "to concentrate a maximum of men and materials in offensive striking units capable of destroying the enemy's capacity for resistance."<sup>22</sup> To accomplish this, General McNair developed the idea of "streamlining" and "pooling" nonessential units. Units and equipment that were needed only for specific situations or missions were taken out of the division and pooled at higher echelons. This method of structuring supported General McNair's concept of maintaining lean, offensively-oriented organizations.

What actually evolved in practice was significantly different. Wartime experience showed that divisions in Europe and in the Pacific needed tanks, antiaircraft, tank destroyers, and nondivisional engineer support in virtually all circumstances. A general trend of establishing habitual relationships between corps combat, combat support, and combat service support organizations and the subordinate divisions developed as the war progressed. Commanders recognized quickly the benefits of maintaining the relationships developed between the attached and pooled organizations.<sup>23</sup>

Not only were the organic support units such as the engineers, medical, and field artillery attached to the infantry regiments but it also became routine to attach the non-organic units provided from higher headquarters. Thus, because all these supporting arms were normally present, the infantry regiment became an ad hoc combined arms organization.

The armored division went through a similar maturing process. In September of 1943, the formation of a new smaller armored division structure did away with the concept of having regimental headquarters that theoretically controlled only one type of battalion. The new combat commands, designated combat command A, B, and Reserve, usually had two task forces consisting of cross-attached infantry and armor companies. Additionally, the task force normally had tank destroyers, armored engineers, and often self-propelled antiaircraft guns attached to them from division based on the mission.

Thus, as World War II progressed, the general trend was for more and more routine association to take place between army, corps, and divisional units. Common techniques and standard procedures were developed for synchronizing the individual arms. The organization of the 7th AR Division during its defense of St. Vith in December of 1944 and its attack to regain St. Vith in January of 1945 provides a good example of this routine association of various arms. Seven different units attached from higher headquarters were present with the 7th Armored Division in both the December 1944 and January 1945 St. Vith operations. Attached units often remained with the supported divisions for months. Within the division itself, frequent restructuring (or task organizing) of the combat commands based on mission requirements was routine. Indeed, the hasty "make do" organization for the St. Vith defense was not a major problem. Subordinates acted under standardized procedures and were able to

operate within the general intent of the commander.

The defense and attack of St. Vith by 7th AR Division was typical of the association of higher headquarters units with the divisions and the formation of task forces that became routine within the divisions. Because of the need to combine arms, habitual association based on frequency of interaction became the norm during World War II by attaching corps units to divisions and in forming the task forces within the combat commands. Frequency of interaction clearly requires examination when deciding what arms to combine organically. Basic logic would suggest that arms that habitually associate with each other should be organized together on a permanent basis.

Competence of Commander to Synchronize the Effects of  
Weapon Systems

The formation of temporary task forces by commanders during World War II illustrates the necessity to consider the competence of the commander when structuring a combined arms organization. Although these task forces were, in most cases, hastily organized to counter an enemy threat, it would be logical to assume that the commanders forming the task forces considered whether their subordinate commanders had the necessary competence to synchronize the various weapon systems available to them. The fluid tactical situations illustrated by battles like Arracourt and St. Vith dictated formation of such temporary task forces at battalion level. Such a task force was TF Hunter, which was formed to assist the CCR of the 4th Armored Division at Luneville

(16-19 September 1944), a battle prior to Arracourt. The task force consisted of Battery C, 94th Armored Field Artillery; Co. A, 37th Tank Battalion; Co. B, 53rd Armored Infantry Battalion; and 1st Platoon, Company E, 704th Tank Destroyer Battalion.<sup>27</sup> It is important to note that the TF consisted of infantry, armor, tank destroyers, and field artillery. The task force commander was responsible for synchronizing these various systems. In this case, TF Hunter assisted the CCR of the 4th AD in driving the Germans out of Luneville. Luneville was won largely by teamwork<sup>28</sup> between the two forces.

Other task forces were formed by the CCR, 4th Armored Division during its advance to Arracourt. They were TF Abrams, TF Curtis, TF Jacques, and TF Kimsey. The compositions of these various task forces also included infantry, armor, tank destroyers, and field artillery assets.<sup>29</sup> These task forces are highlighted to emphasize the different arms that were normally combined to form task forces. The commander of each task force was required to employ effectively those assets assigned to him. It should be noted that all task forces mentioned above were relatively successful in accomplishing their missions.

In the battle for St. Vith, similar task forces were formed. Task Force Jones, led by the commander of the 814th Tank Destroyer Battalion, contained tanks, field artillery, tank destroyers, and cavalry assets.<sup>30</sup> The fact that this force successfully repelled strong German attacks at Cheram and Gouvy suggests that the commander was competent in synchronizing all of his weapon systems.

While these examples show the ability of the commander to synchronize multiple weapon systems, the Battle of Schmidt demonstrates what happens when commanders at various levels do not synchronize the arms available to them. During the battle for Schmidt, there was very little integration of engineer and armor assets that were attached to the infantry regiments. In particular, The 20th Engineer Combat Battalion, a unit attached to the 28th Infantry Division, was given the mission of developing and maintaining the main supply route from Germeter through Vossenach, across the Kall River, and on to Kommerscheidt and Schmidt.<sup>31</sup> Although this trail was the major route for reinforcements and resupply across the gorge, neither the regimental commander nor division leadership synchronized engineer activities with the maneuver forces. Misinformation about the poor condition of the trail forced the division commander to order that a "competent officer" be sent to supervise the efforts on the trail.<sup>32</sup> Obviously, the division commander had reacted to the poor efforts of his subordinate officers to integrate the engineer mission with the mission of the division.

The use of armor in support of the operation was also poor. Tanks were unable to traverse the narrow and steeply banked Kall River trail even though an engineer officer initially deemed it passable by armored vehicles. Five vehicles became obstacles on the trail and blocked further movements although four tanks would later cross.<sup>33</sup> In this case, the engineer lieutenant lacked the

competence to make a knowledgeable decision concerning the trail's condition and its effect on the mobility of the tanks. In Kommerscheidt, there was a severe lack of armor to provide anti-tank protection for the infantry. It was necessary for Lt. Fleig, the commander of the first tank on scene, to search for an infantry leader in order to receive instructions concerning his employment. He was told to locate his own firing positions without regard to integration into the overall defense. During the subsequent battle, Lt. Fleig fought his tanks as single weapon systems; the infantry commander did not integrate the tanks with the other available weapon systems.<sup>34</sup> These problems typify the poor integration of arms by commanders during this battle.

The purpose of discussing these battle examples is to show that for a commander to lead and effectively employ arms in a combined fashion he must be competent in the individual arms. This requires technical knowledge of the weapon system and tactical knowledge for proper employment. Without this knowledge, the commander can only hope the leaders of each arm will employ their individual weapon systems in the best possible way. These individual efforts do not constitute synchronization by the commander. From this discussion, it is clear that a primary factor for consideration in organizing a combined arms organization is whether the commanders at a certain level have the experience and knowledge needed to command effectively and control the combat power at their disposal. Based on the relative degree of success, the commanders of the task forces at

Arracourt and St. Vith had the necessary competence to synchronize the weapon systems. Specifically at Arracourt, BG Clarke obviously trusted LTC Creighton Abrams and believed Abrams knew<sup>35</sup> what he was doing. The commanders at the battle for Schmidt did not enjoy the same success; it can be inferred that the commanders may not have been competent to synchronize the various weapon systems.

Contemporary evidence also supports the selection of this criterion. In the Division 86 study effort, a forerunner to the Army of Excellence study, one of the specific principles of force design was to fight with smaller, single weapon companies.<sup>36</sup> The integration of these companies would be accomplished at battalion level where a more experienced commander and staff were available to fight the combined arms battles. It is clear that much emphasis is placed on attaining effective employment of weapon systems on the modern battlefield. As stated earlier, synchronization of weapons (combined arms) greatly affects the chances for victory. Thus, the competence of the commander who is responsible to synchronize the weapons is a key factor to be considered when determining how a combined arms unit should be formed.

#### Scarcity of Resources

Limited numbers of weapon systems or units have traditionally caused them to be husbanded and centrally controlled. Therefore, a consideration when deciding how to form combined arms organizations is scarcity of resources. It must be



determined whether assets are available in sufficient quantities to permit organic inclusion or whether instead the asset must be pooled at a higher echelon to facilitate its capability to mass.<sup>37</sup> It has already been pointed out that during World War II, various arms were "streamlined" and "pooled." Robert R. Palmer wrote in his history of World War II tactical organization,

The twin aspects of economy were streamlining and pooling. They were phases of the same organizational process. To streamline a unit meant to limit it organically to what it needed always, placing in pools what it needed only occasionally. A pool, in the sense here meant, control of a higher headquarters for the reinforcement or servicing of lower commands, but not assigned to lower commands permanently and organically. Pooling occurred at all levels, from the GHQ reserve pools which reinforced armies down through army pools, corps pools, which, in the infantry, provided mortars and machine guns to reinforce rifle platoons.<sup>38</sup>

General McNair judged the need for economy and flexibility<sup>39</sup> as paramount. He realized the Army could not organize totally resourced units as the necessary resources were not available in sufficient quantities.

In World War II, the strength of combat units of the Army Ground Force never exceeded 2,300,000.<sup>40</sup> This forced the Army to look for ways to increase the effectiveness of the combat strength of the force. "Pooling" was one method adopted to promote efficient use of forces. It envisioned that specific weapons would be held under central control and used in mass at critical points on the battlefield. Piecemealing of combat resources would not produce the desired combat power that General McNair believed was necessary to blunt the enemy's massed

attacks.

Examples of equipment pooled during World War II were the tank, tank destroyer, and antiaircraft artillery. Although, it was certainly possible for greater numbers of these weapons to be manufactured in order to decrease the necessity for pooling, decisions were made that priorities for manufacturing would be shifted to other weapons. For example, General McNair made the following comments reference a proposal to increase the number of .50 caliber anti aircraft guns and 75 mm anti tank guns:

Our limited manpower and production facilities can be utilized to better advantage. Having decided on the total resources to be devoted to these elements there is the added question whether these resources are to be dispersed in dribblets throughout our forces, or whether they are to be organized in mobile masses which can be concentrated at the decisive point under the principle of the economy of force.<sup>41</sup>

No unit in World War II was organically equipped to meet<sup>42</sup> peak requirements. When necessary, pooled units or assets were attached to the division to increase its capability, based on mission requirements. Without a doubt, the scarcity of certain weapon systems played an important role in the organizing of the forces during World War II.

A contemporary example that supports this criterion is the force design initiative called the Army of Excellence Study. One of the guidelines that drove the final force structure was the decision to assign weapon systems to corps in order to save<sup>43</sup> spaces and better support Airland Battle doctrine. In effect, the Chief of Staff of the Army reintroduced the concept of

streamlining and pooling. The 8 inch howitzer and the Chaparral are examples of two weapons that were moved from the division and pooled at corps level because of their limited quantities. Again, the element of limited resources proves to be a crucial factor that must be considered when structuring an organization.

#### Scope of Tactical Missions

A fourth criterion is scope of tactical missions. The full range of operations and threats a unit may have to fight should affect its organization. A unit with a well defined and specific mission should be able to have a more permanent combined arms structure than the unit that must be prepared to fight in a variety of situations. A variety of contemporary examples of combined arms organizations illustrates this criterion.

The first is the French combined arms battalion, also called the tank-infantry battalion. In the early 1960's, at the end of the Algerian campaign, France turned its attention away from its colonial responsibilities and the French military staff began to think again about the employment of modern units on the European battlefield.<sup>44</sup> Many of the organizational changes at division level within the French Army were related to the dynamics of the nuclear battlefield.<sup>45</sup> One of the primary missions of this combined arms organization was to take part in exploitation opportunities created by tactical nuclear weapon strikes. Thus, the French were organizing their forces specifically to meet what they perceived the conditions would be on the European battlefield in the 1960's and 1970's. The

tactical mission on the nuclear battlefield required highly responsive and fast moving units. Thus, the French designed a permanent combined arms battalion that would be able to forego the time consuming process of cross-attaching during a nuclear battle. In sum, the battalion was tailored to meet the requirements of a specific environment and mission.

Another example of tailoring forces based on the scope of tactical missions is the Swedish Army where tank companies and mechanized infantry are permanently integrated and supported by an artillery battalion.<sup>46</sup> The armored battalion and its parent, the Swedish armored regiment, were designed for a specific mission in Northwestern Europe. The scope of the tactical mission was relatively specific and this allowed the formation of a permanently structured organization.

The United States Army's armored cavalry regiment is a combined arms organization consisting of tanks, scouts, infantry, artillery, and mortars that has been formed as an economy force.<sup>47</sup> Cavalry's basic tasks are reconnaissance and security. These tasks are accomplished through combined arms action by a force specifically designed for those missions. The foregoing three examples illustrate how an organization can be tailored to meet a well defined range of tactical missions. The requirement that U.S. forces be capable of global deployment further emphasizes the need to apply this criterion in any effort to develop force structures.

#### Similarity in Range and Mobility

Similarity in range of weapons provides mutual reinforcement

of their individual strengths as well as compensation for their weaknesses and should be considered when deciding which systems are to be combined at a specific level of organization. Likewise, mobility, the physical ability of weapon systems to move and be employed together on the battlefield, should be considered. The fundamental link between both of these factors is the need to maximize the full potential of available weapon systems. To place a weapon system at an echelon where its capabilities (range and mobility) are not fully realized or where it diminishes the capabilities of other weapon systems could be a major mistake.

The trend during the latter stages of World War II to develop temporary organizations to meet specific tactical requirements validates this criterion of ranges and mobility. For example, in preparing to fight the Battle of Arracourt, the mobility of weapon systems was a major factor in determining the force structure with which to conduct the exploitation phase. The 37th Tank Battalion reinforced with a company of infantry from the 53rd Armored Infantry Battalion opened up the bridgehead over the Moselle River in the initial movement towards Chateau-<sup>48</sup> Salins. In this instance, the mobility factors of the participating arms were compatible. Certainly, a slow moving arm could not have supported the 37th Tank Battalion in its rapid attack.

The mechanized cavalry squadron performing distant reconnaissance during World War II illustrates the mobility<sup>49</sup> factor at a higher organizational level. Because the squadron

could cover more frontage than a standard infantry division (the infantry division was the baseline unit), the cavalry squadron was assigned to corps. Tank, tank destroyers, and antiaircraft artillery were other pieces of equipment found to be so mobile that their potential would have been restricted if they had been<sup>50</sup> organically included within the infantry division.

Similarities in weapon ranges were also a major consideration. The organization for combat of the artillery during the Arracourt battle illustrates this. Each combat command normally received at least one of the organic 105 mm artillery battalions from division. The howitzer battalions were organic to the division because their range capabilities coincided with the division's normal frontage. The 155 howitzer battalion, which could range more frontage than a infantry division normally controlled, was attached<sup>51</sup> down from nondivisional units under corps or army control. Because of their significant range, the artillery battalions' capabilities were maximized by consolidating their missions within the division. Another example is the 60 mm company mortars. Because their effective range exceeded the frontage of a rifle platoon, they were normally employed in company pools so their fires could<sup>52</sup> be employed along the entire company front. The range of weapons systems to be employed together within an organization is an important consideration when determining what arms should be organically combined.

#### Functions of Maneuver Battalion

Before examining the four arms in light of these criteria,

we need to identify the tactical functions that the combined arms battalion is required to perform on the modern battlefield. FM 100-5 states a maneuver battalion normally performs a single function that supports the plan of the parent unit.<sup>53</sup> It either defends, attacks, or delays while being supported by combat support and combat service support units. Along with other units, it is integrated into the scheme of maneuver of the brigade. The maneuver battalion accomplishes these tasks by maneuvering to destroy the enemy and seize and hold terrain.<sup>54</sup> The battalion also masses fires to suppress and destroy the enemy.

To accomplish these tactical functions, the battalion will have to fight on a mid- to high-intensity battlefield very chaotic, intense, and destructive in nature. More often than not, the battlefield will be non-linear in nature as a result of the increased lethality of weapons and increased speed of units. Because the Army has worldwide commitments, the battalion must be prepared to fight on all types of terrain and in all types of climatic conditions. The threat of nuclear, chemical, or biological warfare remains high. And the battle could last hours instead of days because of the increased destructiveness of war. The battalion will likely face an enemy employing a doctrine characterized by mass and echelonment, rapid tempo, attacks on multiple axes, penetrations, and continuous operations. The specific threat force opposing a U. S. battalion in the defense in a mid- to high-intensity conflict will be an attacking first

echelon regiment; on the offensive, the opposition will be  
55  
elements of a division.

It is evident the maneuver battalion must be able to conduct operations in a variety of wartime conditions - both offensive and defensive - and on various types of terrain. Because of the fluidity of the battlefield and probable loss of communications, the success of the maneuver battalion will depend on its ability to organize quickly and act independently. Having described the tasks to be accomplished by a maneuver battalion and the battlefield on which it will fight, the next section of the paper will be an analysis of the selected arms in relation to the developed criteria.

#### Analysis of Arms Using Selected Criteria

In this analysis, the criteria derived above will be applied to each of the four arms according to anticipated battlefield conditions in order that specific conclusions can be drawn reference the structure of a combined arms battalion. The four arms will be analyzed first using the criterion, frequency of interaction.

On the modern battlefield, the frequency of interaction between infantry and armor is clear. At battalion level, the decision of interaction is made by the brigade commander. He allocates forces to the battalion task forces based on his concept of the operation. He accomplishes this by analyzing the factors of mission, enemy, terrain and weather, troops and time available (METT-T).

As previously discussed, infantry and armor forces each have



peculiar strengths that offset each other's weaknesses. Because of this, they are complementary to each other and are often integrated into the same organization by the brigade commander. In fact, infantry and armor units are so dependent on each other today that it is hard to imagine them working alone.<sup>56</sup> We have already seen that current doctrine emphasizes the integration of combined arms at battalion level and the current structure permits this task-organizing.

Current training exercises provide excellent evidence of this frequent interaction between infantry and armor. For example, only cross-attached task forces participate in training rotations at the National Training Center. The U. S. Army expects to fight combined and trains to that standard at the National Training Center and elsewhere. Thus, looking solely at the criterion, frequency of interaction, the implication is that armor and infantry should be organically combined at battalion level.

The maneuver battalion conducts both offensive and defensive missions. In these missions overwhelming combat power, the sum of two main elements, maneuver and firepower, is necessary to defeat the enemy. Because indirect firepower is a key ingredient, indirect fire support assets (artillery) routinely support the maneuver battalion in its fight.

The fire support of the maneuver battalion currently consists of two distinct elements. In addition to its organic mortars, the task force receives fire support from divisional and

non-divisional field artillery units. The standard artillery support element for a maneuver battalion is one 155 mm howitzer battalion firing in direct support of the maneuver brigade. Very seldom is a maneuver battalion without artillery support unless it has a reserve mission. Again, training exercises at the National Training Center provide solid evidence of this frequent interaction between the maneuver battalion and the artillery arm. Therefore, it is concluded that the maneuver battalion should have an indirect fire support (artillery) element permanently placed in its structure.

Engineer support units increase the combat effectiveness of the maneuver battalion primarily by performing tasks related to the mobility, countermobility, and survivability, and general engineering categories of support.<sup>57</sup> These engineer missions support the accomplishment of both offensive and defensive missions assigned to the task forces.

Doctrine states that mobility, countermobility, and survivability tasks are the responsibility of the task force, not the engineers.<sup>58</sup> It is also recognized that these categories of support contribute greatly to the overall combat effectiveness of the task force. Realizing the task force needs engineer support for almost all types of missions and because combat engineers have the expertise in such areas, a task force commander can expect to get at least one engineer platoon from the engineer company at brigade.<sup>59</sup> Because of this frequent interaction between the task force and engineer arm, it is suggested that the maneuver battalion have engineer assets organically assigned to

it based solely on frequency of interaction.

In summary, looking solely at this criterion, the implication is that infantry, armor, field artillery, and engineer should be organically placed within the battalion. On today's battlefield, the majority of the missions assigned to a maneuver battalion require these arms to be employed together.

#### Competence of Commander to Effectively Synchronize Weapon Systems

The competence of the commander to maximize the combat effectiveness of the weapon systems at his disposal is key to achieving victory on the battlefield. Doctrinally, infantry and armor officers are expected and are trained to employ the two primary combat systems of both arms - the M1 and M2. This task of integrating both is not that difficult since the doctrinal employment of each is quite similar - both are fire and maneuver elements.

Results of training exercises such as external evaluations and those conducted at the National Training Center demonstrate the competence of task force commanders to integrate and fight the infantry and armor under realistic battlefield conditions. Further to support this evidence, it should be emphasized that there has been little or no discussion in professional journals or elsewhere promoting the use of pure units because of the demonstrated incompetence of the battalion commanders to use the infantry and armor arms.

The synchronization of artillery into the scheme of maneuver by the commander differs from the maneuver arms because

of its unique characteristics. First of all, the field artillery system is inherently different from the close combat systems in that it is essentially a firepower arm. It supports the destruction of the enemy through firepower; maneuver to close with and destroy the enemy is normally not done.

Specifically, it is an indirect fire weapon system as opposed to the direct fire weapon systems used by the infantry and armor. As an indirect fire system, its tactical employment is quite different from infantry and armor; thus, a commander must deal with employment considerations quite diverse from those of the maneuver arms. Basic tasks such as coordination of fire support, the acquisition of targets, and the delivery of fires are unique and distinct from those conducted by maneuver units. For example, one of the routine tasks that must be accomplished for delivery of fires is the choice of munitions. The process of selecting the proper combination of technologically advanced munitions for a specific target is a complex one that requires a vast knowledge of the characteristics and capabilities of the ammunition. The commander must know these facts in order that the full potential of the weapon system be realized. This technical knowledge must be balanced with a firm understanding of the tactical employment principles.

Additionally, the task force commander is trained to "exploit the effects" of the artillery fire. He does this by performing non-specialized tasks such as calling for fire and adjusting fire. He does not employ the arm itself. Technical

proficiency is not a prerequisite for obtaining the combat power of the fires. In fact, it is probably too much to expect a commander to be technically competent in both maneuver and fire support arms. He may not have the ability to synchronize totally such a unique arm as field artillery along with infantry and armor. Complete synchronization of similar arms is tough to achieve; accomplishing it with numerous diverse arms is even tougher.

The engineer arm is similar to the field artillery in that it requires the commander to have specific tactical and technical knowledge in order for the arm to be optimally employed. Battlefield missions involving mine and countermine operations, counterobstacle and obstacle development, gap-crossing operations, and combat route operations all require a specialized knowledge of the engineer system. The mere estimation of the amount of manhours needed to emplace a certain obstacle is not easily done as it is based on a thorough knowledge of the capabilities of the engineer equipment. The commander also has the task of managing numerous pieces of specialized equipment. While there are many vehicles to maintain and employ, unfortunately, there are often only one or two of each. This specialized knowledge and equipment make the engineer arm quite unique and different from other combat and combat support arms.

Currently, because he receives little formal training in these areas, a maneuver battalion commander has only a general knowledge of the technical employment principles of both artillery and engineer units. In fact, it may be too much to

expect the average officer with 15-18 years service to be technically proficient in four arms. This is especially true when all he needs do is synchronize the effects of the support arms. As will be noted later, the engineer and artillery assets are essential but scarce resources. Seldom does a maneuver commander know the specific details required to employ effectively the assets of the artillery and engineer systems. Based on the scarcity of resources and the degree of specialization required to employ effectively and train both arms, the implication is that they should not be permanently placed within the maneuver battalion. Because the infantry and armor are both maneuver arms with similar employment principles, they should be organically combined at battalion level.

#### Scarcity of Resources

Scarcity of resources is a major factor to be considered in any discussion to form combined arms battalions. The Army has a mandated end strength, therefore, the amount of various arms that exists in the force structure today is fixed. Increases in any arms will require corresponding decreases in others.

Currently, maneuver brigades consist of both infantry and armor battalions. As noted earlier, these battalions routinely cross-attach to form task forces. Although the task forces formed are not necessarily balanced in terms of infantry and armor, enough of each arm exists to form a combined arms force. To be more specific, an Army of Excellence mechanized division has five battalions each of infantry and armor. An armored

division has 6 battalions of armor and 4 battalions of infantry. The ratio of infantry and armor battalions within both divisions allows the formation of combined arms battalions.

Whether to combine organically field artillery assets based on resources is complicated by the fundamental question of what is enough. Under the present organizational structure, the maneuver battalion could expect to receive a battery sized organization for fire support. The fires generated by one organic battery could not be expected to produce the necessary shock and destruction required to wear down the enemy. Consequently, the principle of massing is another consideration when organically combining artillery.

The artillery is relied upon to generate combat power for the maneuver battalion. It accomplishes this primarily by its ability to mass fires. Organic batteries of different battalions would not normally mass their fires in support of each other because of their inherent responsibilities as outlined by their command relationships. If each battalion received an organic battery, this would leave the division commander with only the MLRS battery available to influence the battle by massing fires. Thus, sufficient assets would not be available to produce adequate results for the battalion. Based on these limited field artillery assets, it is better to retain the current procedures of having a field artillery battalion support the maneuver brigade and have the ability to mass fires for the maneuver battalion.

The engineer arm's resource situation is quite similar to

that of the field artillery. The current structure would allow one engineer platoon to be organically assigned to each maneuver battalion. Most missions of the maneuver battalion require more engineer support. The one remaining engineer company at division level would not make a significant impact even if committed. Because of these small, limited engineer resources in each battalion, the brigade commander must be able to shift available engineer forces as needed. Permanently placing the engineer force within the combined arms battalion would severely limit the flexibility to concentrate necessary engineer support when and where needed. Therefore, the engineer assets should not be organically placed within the battalions.

In summary, based on this criterion, scarcity of resources, the analysis shows that only infantry and armor should be organically combined within a battalion sized organization. Placing the limited artillery and engineer assets in a combined arms battalion almost guarantees that sufficient combat power will not be available for most tactical missions.

#### Scope of Tactical Missions

Instead of evaluating each arm separately based on this criterion, a broader perspective is taken by linking the Airland Battle doctrine requirements with the desire to structure a specific combined arms battalion.

Each arm has its particular capabilities and limitations and therefore is better utilized for some missions than others. Despite having specific capabilities, each arm is expected by



Airland Battle doctrine to perform in a variety of settings and situations. The doctrine states that Army forces must be capable of operating effectively in any battlefield environment.<sup>60</sup> Therefore, the exact types of missions to be performed by the combined arms battalion are numerous. Because of this uncertainty of assigned mission, it could be deduced that any effort to place permanently fixed amounts of arms into an organization is not beneficial. Any permanent organization would not be as flexible in performing multiple, diverse missions as would be an ad hoc tailored organization. However, this is not totally correct. A permanently organized combined arms organization would be capable of conducting most missions. If there were instances when a task force of other weighted forces were necessary, the balanced battalion could still be tailored differently by cross-attaching or receiving companies from another battalion within the brigade. Permanent combined arms battalions would minimize the need for cross-attaching for normal missions and the problems that go along with it. A key factor is the reduction of the turmoil brought on by frequent task-organizing.

The conclusion from the analysis of this criterion is that the required flexibility demanded by the wide scope of tactical missions to be conducted by U. S. Army forces is not necessarily degraded by the formation of a combined arms battalion. The continued capability to task organize to meet specific mission requirements still exists.

### Range/Mobility of Weapons

The M1 Abrams tank and M2 Bradley Fighting Vehicle. were designed to operate as a team on the modern battlefield. Their ranges are relatively the same. Both are capable of defeating enemy armor with their respective direct fire anti-tank systems. Also, the mobility of the two weapon systems on road and cross country routes is relatively the same. Both weapons systems were intentionally designed to operate as a team and currently do in the temporary ad hoc combined arms task forces. There are no incompatible system characteristics that would prevent them from being organically combined within one permanent organization.

The primary field artillery weapon system, the M109 (155 mm) howitzer, is designed to fire approximately eighteen kilometers. Given this range, the artillery is able to fire close support missions, counterfire missions, and interdiction missions against enemy second echelon elements opposing the battalion. However, the range capability of the M109 exceeds the normal range requirements of a battalion. Assignment of M109 resources to battalion level organizations would deny employment of the maximum capabilities of the weapon.

It should be noted that a battalion currently has its own organic fire support element - the 4.2 inch mortar platoon. These mortars have a range of 5650 meters and are responsive to the needs of the fighting force. The mortars are able to move with the maneuvering force, a distinct advantage over supporting artillery weapons. Thus, the decision to exclude cannon artillery support from the combined arms battalion does not

totally deny indirect fire support to the battalion.

The M109 howitzer is not designed to maneuver cross country with infantry and armor but is capable of moving behind the forward elements to provide fire support. Although it has the required mobility to be placed organically within a combined arms battalion, such assignment would not effectively utilize the range capabilities of the weapon.

Weapon range criterion does not pertain to the engineer arm as no weapon system is normally found within the engineer platoon supporting the maneuver battalion. The mobility criterion is similar to that of the artillery. The engineer assets available to the battalion presently move in M113 armored personnel carriers and the M9 Armored Combat Earthmover. Both vehicles are capable of moving at speeds of 30 mph on road surfaces. Neither has the cross country mobility of the M1/M2 weapon systems. But based on their combat support mission, they do have the required mobility to be placed organically within a combined arms battalion.

#### Conclusion

The following matrix highlights the results of the analysis of the four arms according to the derived criteria. The two criteria, competence of the commander and scarcity of resources, are the most crucial criteria in deciding which arms should be included in a combined arms battalion. They are the most crucial because of their ultimate effect on the potential combat power of the force. Obviously, if the resources available to a

particular echelon do not generate the necessary combat power, then it is illogical to place those assets at that level. Closely related in principle is the competence of the commander. If he is unable to synchronize the arms, then again, it is a mistake to provide those assets.

CRITERIA/ ARM	FREQUENCY OF INTERACTION	COMPETENCE OF COMMANDER	SCARCITY OF RESOURCES	SCOPE OF MISSIONS	RANGE/ MOBILITY OF WEAPONS
INFANTRY	YES	YES	YES	YES	YES/YES
ARMOR	YES	YES	YES	YES	YES/YES
ARTILLERY	YES	NO	NO	YES	NO/YES
ENGINEER	YES	NO	NO	YES	-/YES

The inability of the commander to synchronize the effects of the specialized arms, artillery and engineer, into the overall scheme of maneuver is a major factor that prevents their inclusion as part of the combined arms battalion. A commander on the modern battlefield can control only so many assets. Further, the introduction of specialized arms taxes his already stretched abilities to synchronize the battle.

Artillery and engineers are also affected by the criterion, scarcity of resources. Both arms are limited in number within the Army force structure and this requires both to mass critical assets in order to maximize their contribution to combat power. This need to mass is another factor influencing the decision not to combine artillery and engineer assets within the combined arms battalion. Insufficient assets that result in very little added

combat power for the battalion are better pooled at higher echelons in order to insure proper massing at the critical times on the battlefield.

The other discriminating factor for artillery is the criterion, range of weapon system. The artillery weapon, the 155 mm howitzer, has a greater range than what can normally be exploited based on a battalion's frontage or its limited deep acquisition assets. Therefore, the inclusion of artillery within the combined arms battalion would prevent the full use of the weapon's potential.

In review, it should be emphasized that infantry and armor are the only two arms that meet the requirements of each criterion. Based on the five derived criteria, the combining of these two arms organically within a battalion is a logical choice. Both artillery and engineer fail to meet the requirements for the two most critical criteria, competence of the commander and scarcity of resource.

This proposal to combine infantry and armor is based on the application of five criteria derived from historical and contemporary examples discussed in this paper. Certainly, other important determinants not identified in this analysis should be considered before any final decisions concerning the structure of the combined arms battalion are made. Possible examples are peacetime training requirements and the issue of sustainment.

This proposal to combine infantry and armor is supported strongly by recent initiatives within the U. S. Army to form combined arms battalions. As noted in the introduction, a

brigade of the 1st Cavalry Division is currently forming combined arms battalions. The only two arms selected to be organically combined are infantry and armor.<sup>61</sup> The primary purpose in combining these two arms was to optimize the war fighting capability of the M1/M2 weapon systems. As emphasized earlier, these two systems were initially designed to be complementary of each other. By combining these two arms permanently as the 1st Cavalry Division has done, it is almost certain that the combat power potential of the organization will increase merely based on greater cohesion alone. This, of course, is a goal of any organizational restructuring effort. The time to pursue the combined arms battalion concept is now.

#### END NOTES

1. Gunter E. Rothenberg, The Art of Warfare in the Age of Napoleon, First Midland Book Edition (Bloomington: Indiana University Press 1980), p. 17.
2. Rothenberg, p. 150.
3. U.S. Army, Field Manual 100-5, Operation, (Fort Leavenworth, KS., May 1986), p. 23.
4. Captain Jonathan M. House, Towards Combined Arms: A Survey of 20th Century Tactics, Doctrine, and Organization (Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1984), p.1.
5. Telephone interview with Major David Hilliard, Force Modernization Officer, 1st Cavalry Division, 10 Nov. 1986.
6. LTC William A. Depalo, Jr., "Extended Cross-Attachment," Infantry (July-August 1984), p. 5.
7. House, p. 106.
8. House, p. 155.
9. Major Robert A. Doughty, The Evolution of U.S. Army Tactical Doctrine, 1946-76, (Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1979), p. 5.
10. William S. Lind, Maneuver Warfare Handbook (Boulder and London: Westview Press, 1985), p. 20.
11. House, p. 2.
12. Carl Von Clausewitz, On War edited by Michael Howard and Peter Paret, (Princeton University Press, 1984), p. 285.
13. Clausewitz, p. 285.
14. Clausewitz, p. 291.
15. Baron De Jomini, The Art of War (Westport, Connecticut: Greenwood Press, Publisher, 1977), p. 319.
16. Jomini, p. 320.
17. Jomini, p. 203.
18. U.S. Army, Student Text 20-6, Selected Readings in Military History: Evolution of Combined Arms Warfare, (Ft. Leavenworth, KS.: U. S. Army Command General Staff College, July 1985), p. 32.
19. John A. English, On Infantry (New York, N.Y.: Praeger Publishers, 1984), p. 30.

20. English, p. 126.
21. English, p. 42.
22. Kent Roberts Greenfield, Robert R. Palmer, and Bell I. Wiley, The Organization of Ground Combat Troops, (Washington D.C.: Historical Division, Department of the Army, 1947), p. 273.
23. House, p. 107.
24. "The Return to St. Vith," Research and Evaluation Division, The Armored School, Ft. Knox, KY. 25 June 1948, p. 13.
25. Major Paul St. Laurent et al., The Battle of St. Vith, (Ft. Leavenworth, KS.: Combat Studies Institute, U.S. Army Command and General Staff College, May 1984), p. 27.
26. St. Laurent, p. 85.
27. Richard H. Barnes, "Arracourt--September 1944," (Thesis, 1982), p. 63.
28. Barnes, p. 66.
29. Barnes, p. 184, p. 190.
30. The Battle at St. Vith, Belgium 17-23 Dec. 1944 The U.S. Army Armor School (3rd Printing) p. 18.
31. Charles B. MacDonald and Sidney T. Matthews, Three Battles: Arnaville, Altuzzo, and Schmidt (Washington D.C.: Office of the Chief of Military History, Department of the Army, 1952), p. 286.
32. MacDonald, p. 313.
33. MacDonald, p. 304.
34. Classroom discussion with Lieutenant Fleig, 5 September 1986
35. Barnes, p. 153.
36. U.S. Army, Division 86 Final Report (Ft. Leavenworth, KS.: U.S. Army Combined Arms Combat Development Activity, Combined Arms Center, August 1981), p. 1-5.
37. Glenn M. Harned, "The Principles of Tactical Organization and their Impact on Force Design in the U.S. Army," (unpublished monograph, 2 December 1985), p. 5.
38. Greenfield, p. 291.
39. Greenfield, p. 293.



40. Greenfield, p. 290.
41. Greenfield, p. 296.
42. Greenfield, p. 291.
43. BG John C. "Doc" Bahnsen, Jr., "The Kaleidoscopic U.S. Army," Armed Forces Journal, November 1985, p. 82.
44. Phillippe C. Peress, "The Combined Arms Battalion Concept in the French Army," (Unpublished study project, 1977), p. 5.
45. House, p. 170.
46. Captain F. R. Thomas and Captain P. I. Olsson, "The Swedish Armor Battalion" Armor (March-April 1979) p. 28.
47. U.S. Army, Field Manual 17-95, Cavalry, (Department of the Army, 1 July 1977), p. i.
48. Barnes, p. 49.
49. Greenfield, p. 292.
50. Greenfield, p. 292.
51. Greenfield, p. 292.
52. Greenfield, p. 292.
53. Field Manual 100-5, 1986, p. 41.
54. U.S. Army, Field Manual 71-2J The Tank and Mechanized Infantry Battalion Task Force (Coordinating Draft), (Washington, D.C., December 1984), pp. 1-34.
55. U.S. Army, Tactics Course Instruction P315 and P316, (Ft. Leavenworth, KS.: U.S. Army Command and General Staff College, 1985.
56. Major John C. Everson, "The Armored Infantry Battalion: Organized and Trained as It Will Fight," Military Review (September 1981), p. 61.
57. Field Manual 71-2J, 1984, pp. 7-55.
58. Field Manual 71-2J, 1984, pp. 7-64.
59. Field Manual 71-2J, 1984, pp.7-64.
60. Field Manual 100-5, 1986, p. 1.
61. Telephone interview with Major David Hilliard, 10 Nov. 1986.

## BIBLIOGRAPHY

### BOOKS

- Greenfield, Kent R., Robert R. Palmer, and Bell I. Viley. The Army Ground Forces; The Organization of Ground Combat Troops. Washington, D. C.: Historical Division, Department of the Army, 1947.
- Jomini, Baron de. The Art of War. Translated by Cpt. Mandell and Lieutenant Craighill, Philadelphia, PA.: Westport, Connecticut: Greenwood Press, 1977.
- Lind, William S. Maneuver Warfare Handbook. Boulder and London: Westview Press, 1985.
- MacDonald, Charles, B. and Matthews, Sidney T. Three Battles of Arraville, Altuzzo, and Schmidt. Washington, D. C. : Office of the Chief of Military History, Department of the Army, 1952.
- Rothenberg, Gunter E. The Art of Warfare in The Age of Napoleon. Bloomington: Indiana University Press, 1980.
- Von Clausewitz, Carl. On War. Edited and Translated by Michael Howard and Peter Peret, Princeton, N.J.: Princeton University Press, 1984.

### U. S. Government Publications

- Barnes, Richard H. Arracourt -- September 1944. Ft. Leavenworth, KS.: U. S. Army Command General Staff College, 1982.
- Cavalry; FM 17-95. Washington, D. C.: Department of the Army, 1977.
- Doughty, Robert A. The Evolution of U. S. Army Tactical Doctrine, 1946-1976. Ft. Leavenworth, KS. : U. S. Army Command and General Staff College, 1979.

House, Jonathan M. Towards Combined Arms Warfare: A Survey of 20th Century Tactics, Doctrine, and Organization. Ft. Leavenworth, KS.: U. S. Army Command and General Staff College, August, 1984.

\_\_\_\_\_. Operations: Field Manual 100-5. Ft. Leavenworth, KS.: U. S. Army Command and General Staff College, 1986

\_\_\_\_\_. Selected Readings in Military History: Evolution of Combined Arms Warfare, Student Text 20-6. Ft. Leavenworth, KS.: U. S. Army Command and General Staff College, July 1985

\_\_\_\_\_. The Tank and Mechanized Infantry Battalion Task Force, Field Manual 71-25 (Coordination Draft). Washington, D. C.: Department of the Army, 1984.

### Periodicals

Bahnsen, John C. Jr. "The Kaleidoscope U. S. Army." Armed Forces Journal International, November 1985, pp. 78-88.

Depalo, William Jr. "Extended Cross-Attachment." Infantry. July-August 1984, pp. 5-6.

Everson, Major John C. "The Armored Infantry Battalion: Organized and Trained as It Will Fight." Military Review. September 1981.

Thomas, Captain F. R. and Olsson, Captain P. I. "The Swedish Armor Battalion" Armor. March-April 1979, pp. 27-29.

### Documents

\_\_\_\_\_. "The Battle at St. Vith, Belgium 17-23 Dec. 1944" The U. S. Army Armor School (3rd Printing).

\_\_\_\_\_. "Discussion with Lieutenant Fleig (AMSP Course Instruction)." Ft. Leavenworth, KS. U. S. Army Command and Staff College, 5 September 1986

\_\_\_\_\_. Division 86 Final Report. Ft. Leavenworth, KS.: U. S. Army Combined Arms Combat Development Activity, Combined Arms Center, August, 1981.

Harned, Glenn M. "The Principles of Tactical Organization and

their Impact on Force Design in the US Army." Unpublished monograph, 2 December 1985

Peress, Philippe C. "The Combined Arms Battalion Concept in the French Army." Unpublished Study project, 1977.

\_\_\_\_\_. "The Return to St. Vith." Research and Evaluation Division, The Armored School, Ft. Knox, Ky., 25 June 1948.

St. Laurent, Major Paul, et al., The Battle of St. Vith, Ft. Leavenworth, KS.: Combat Studies Institute, U. S. Army Command and General Staff College, May 1984.

\_\_\_\_\_. "Tactics P315 and P316 (Course Instruction)." Ft. Leavenworth, KS. U. S. Army Command and General Staff College, 1985.

